

### REMARKS

Claims 1-20 are pending. Claims 7, 12, 13 and 17 are amended herein. Claims 7, 12 and 17 are amended to include that the "smoothing layer comprises titanium rich nitride." Support for these amendments can be found on at least page 4, lines 1-5. Claim 13 is amended to change the claim from which it depends. Applicants submit that the amendments do not add new material to the current Application. No amendment made is related to the statutory requirements of patentability unless expressly stated herein. No amendment made is for the purpose of narrowing the scope of any claim.

#### **35 U.S.C. § 112 Rejection**

Applicants submit that claims 8 and 16 are in compliance with 35 U.S.C. § 112, second paragraph, because they particularly point out and distinctly claim the subject matter which Applicants regard as the invention. The Examiner contends that, "It is unclear...what a high dielectric constant material is when there is no indication of a reference point to determine what the level of high is meant to be." Applicants contend that the specification provides a reference point "to determine what the level of high is meant to be." On page 7, lines 14-16, the specification reads, "As used herein a high dielectric constant material is a material with a dielectric constant greater than that of silicon dioxide." For at least this reason, the level of high for the phrase "high dielectric material" is clear. Therefore, withdrawal of the rejection is requested.

#### **35 U.S.C § 102 Rejections**

Applicants wish to thank the Examiner for providing line numbers with the rejection instead of relying solely on the paragraph number. Paragraph 0091, which is used to reject almost all of the elements of the claims, is a long paragraph and it was very helpful to know which lines within the long paragraph the Examiner was referring to when rejecting the claims. Thank you.

Applicants respectfully submit claims 1-6, 8-9, 11-12, 15-18, and 20 are patentable over Cabral (US2004/0092073) under 35 U.S.C. § 102(e); Cabral fails to teach all features of the claims.

#### **Claims 1-6, 8-9, 11-12, 15-16, and 20**

More specifically, at least independent claims 1, 11, and 20, and its dependencies are patentable over Cabral because Cabral fails to teach a smoothing layer, which is over either a first electrode or a conductive layer and has a surface roughness less than that of either the first

electrode or the conductive layer. While Cabral teaches a layer of Ta over a layer of Ti and a layer of TaN, Cabral fails to teach or suggest that Ta has a surface roughness less than that of Ti or TaN. In addition, no evidence is provided to support such statement. In accordance with MPEP § 2144.03, Applicants herein request that support be provided proving that Ta has a surface roughness less than that of Ti or TaN if the rejection is to be upheld. For at least these reasons, claims 1-6, 8-9, 11-12, 15-16, and 20 are patentable over Cabral under 35 U.S.C. § 102(e).

Furthermore, claims 1-6, 8-9, 11-12, 15-16, and 20 are patentable over Cabral in all regards. Cabral teaches that the Ta layer, which the Examiner relies upon to be the smoothing layer in the claims, is a bottom electrode. (See [0090], top of right column, 4<sup>th</sup> line down.) Cabral is silent as to the surface roughness of materials. Instead, Cabral is concerned with a process for forming low-k materials. (See Abstract and Summary of Invention.) The embodiment described in paragraph [0091], which the Examiner relies upon, is one way to implement Cabral's process to form a capacitor. Cabral fails to teach or suggest that the roughness of the materials is relevant. Therefore, there is no motivation from Cabral to have a smoothing layer, which is over a first electrode or a conductive layer, having a surface roughness less than that of the first electrode or the conductive layer, as stated in dependent claims 1, 11 and 20. Thus, for at least these reasons, all claims 1-6 and 20 are patentable over Cabral in all regards.

In addition, some dependencies of claims 1, 11 and 20 are patentable over Cabral for additional reasons. For example, Cabral fails to teach (or suggest) a second smoothing layer having a roughness less than that of the second electrode, as stated in claim 2. While Cabral teaches that a layer of Ta and an electrode of TiN or Ti, Cabral fails to teach that Ta has a surface roughness less than that of TiN or Ti. In addition, no evidence is provided to support such statement. In accordance with MPEP § 2144.03, Applicants herein request that support be provided if the rejection is to be upheld.

#### **Claims 17-18**

More specifically, at least independent claim 17 and its dependencies are patentable over Cabral because Cabral fails to teach or suggest a "first smoothing layer comprising titanium rich nitride". While Cabral teaches a smoothing layer of tantalum, Cabral fails to teach or suggest a titanium rich nitride. As disclosed in Applicants' specification on page 5, line 26 to page 6, line 1, titanium rich nitride (TiRN) has a stoichiometric ratio of Ti:N that is greater than 1:1. Cabral fails to teach using titanium nitride with a stoichiometric ration greater than 1:1 as a smoothing layer. For at least these reasons, claims 17-18 are patentable over Cabral under 35 U.S.C. § 102(e).

Furthermore, claims 17 and 18 are patentable over Cabral in all regards. Cabral fails to teach or suggest using titanium rich nitride, especially for a smoothing layer. As discussed above, Cabral fails to teach or suggest using smoothing layers. Cabral is silent as to the surface roughness of materials. Instead, Cabral is concerned with a process for forming low-k materials. (See Abstract and Summary of Invention.) The embodiment described in paragraph [0091], which the Examiner relies upon, is one way to implement Cabral's process to form a capacitor. Cabral fails to teach or suggest that the roughness of the materials is relevant. In addition, Cabral fails to teach or suggest using a nonstoichiometric ratio of Ti:N. Thus, for at least these reasons, all claims 17-19 are patentable over Cabral in all regards.

### 35 U.S.C. § 103 Rejections

Claims 7, 10, 13, 14, and 19 are patentable over Cabral under 35 U.S.C. § 103(a). Cabral fails to suggest features of claims 7, 10, 13, 14 and 19.

#### Claims 7, 10, 13, and 14

As previously discussed (see "35 U.S.C. § 102" section), Cabral fails to teach or suggest all features of independent claims 1 and 11 from which 7, 10, 13 and 14 depend. For example, Cabral fails to teach or suggest a smoothing layer, which is over either a first electrode or a conductive layer and has a surface roughness less than that of either the first electrode or the conductive layer. For at least these reasons, these claims are patentable over Cabral under 35 U.S.C. § 103(a).

In addition, claim 7 is patentable over Cabral under 35 U.S.C. § 103(a) for another reason. As discussed above in regards to claim 17, Cabral fails to teach or suggest a "first smoothing layer comprising titanium rich nitride." Therefore, for at least this reason, claim 7 is patentable over Cabral for an additional reason.

#### Claim 19

As discussed above in regards to claim 17, Cabral fails to teach or suggest a "first smoothing layer comprising titanium rich nitride." Therefore, for at least this reason, claim 19 is patentable over Cabral.

Believing to have responded to every rejection raised by the Examiner in the last communication mailed, Applicants believe the present Application is currently in a condition of allowance. However, for brevity, simplicity, and to hasten the prosecution process, rejections of dependent claims may not be addressed if arguments are provided explaining how the independent claims are allowable over all cited prior art or if other reasons are given as to why

the dependent claim is patentable. Any rejections of dependent claims not addressed are reserved to be discussed later.

Applicants earnestly solicit allowance of all pending claims. Please contact Applicant's practitioner listed below if there are any issues.

#### IDS

Applicants request that the Examiner return the IDS that was filed with the application on September 23, 2003 with his initials next to each reference or that he cross out any references so that Applicants know for certain the status of the submitted prior art and, if necessary, can resubmit any art that was not considered. The Examiner signed the IDS form but failed to mark each reference with his initials or cross through the references, if applicable, as required by MPEP 609.

If Applicant has overlooked any additional fees, or if any overpayment has been made, the Commissioner is hereby authorized to credit or debit Deposit Account 503079.

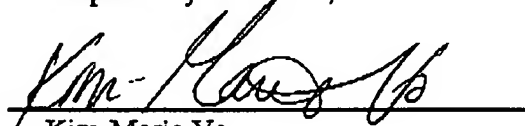
Respectfully submitted,

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